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Applicant: **Shuo-Yen Robert Li**

Case: **8**

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Group Art Unit: **2662**

Examiner: **Hassan Kizou**

Title of Invention: **A CONDITIONALLY NONBLOCKING SWITCH OF THE DECOMPRESSOR TYPE**

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SIR:

Enclosed is a supplement to the Preliminary Amendment, received in the US Patent Office on September 11, 2001, in the above-identified application. This supplement is in Response to a Notice of Non-Compliant Amendment (37CFR 1.121) dated February 27, 2003. This Notice required a marked-up version of the replacement pages 8 and 9 included in the Preliminary Amendment -- marked-up pages 8 and 9 are enclosed, starting with page 12 and ending with page 15 to be considered as appended to the Preliminary Amendment.

Respectfully submitted,

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Date: 3-10-03

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Pages 8 and 9 were changed as follows ([denotes the beginning and] denotes the end of removed words, and underline to text -- not the heading -- denotes the addition of words):

SUMMARY OF THE INVENTION

The shortcomings of the prior art, as well as other limitations and deficiencies, are obviated in accordance with the present invention by applying algebraic principles to the physical realization of a large switching fabric based upon contemporary technologies.

[In accordance with a broad system aspect of the present invention, an N×N decompressor for serving a connection request to route k incoming signals, $k \leq N$, and for enabling conditionally nonblocking switching, includes (a) a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses and an array of N output ports with N distinct output addresses wherein the k incoming signals arrive at k distinct input ports determining k active input addresses and are destined for corresponding k distinct output ports determining k active output addresses; and (b) control circuitry, coupled to the switch, for routing the incoming signals from the k distinct input ports to the corresponding k distinct output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to constraints on the connection request: (1) the k active input addresses are consecutive upon a rotation of the ordering of the N input addresses, and (2) the correspondence between the k active input addresses and the k active output addresses is order preserving after the rotation.

In accordance with a broad method aspect of the present invention, a method for constructing an N×N decompressor to serve a connection request to route k incoming signals, k≤N, includes: (a) configuring a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses and an array of N output ports with N distinct output addresses wherein the k incoming signals arrive at k distinct input ports determining k active input addresses and are destined for corresponding k distinct output ports determining k active output addresses; and (b) routing the incoming signals from the k distinct input ports to the corresponding k distinct output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to constraints on the connection request: (1) the k active input addresses are consecutive upon a rotation of the ordering of the N input addresses, and (2) the correspondence between the k active input addresses and the k active output addresses is order preserving after the rotation.]

In accordance with a broad method aspect of the present invention, a method for implementing a class of N×N decompressors each serving a connection request to route m incoming signals, m≤N, and for enabling the service of any connection request in a nonblocking way on the condition that the connection request is compliant to certain constraints, the method for each of the decompressors includes: (a) configuring a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses and an array of N output ports with N distinct output addresses wherein the m incoming signals arrive at m distinct input ports determining m active input addresses and are destined for corresponding m distinct output ports determining m

active output addresses, and wherein said constraints on the connection request are that: (1) the m active input addresses are consecutive upon a rotation of the ordering of the N input addresses, and (2) the correspondence between the m active input addresses and the m active output addresses is order preserving after the rotation; and (b) routing the incoming signals from the m distinct input ports to the corresponding m distinct output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to said constraints on the connection request, said class excluding (i) those having a switch constructed from the banyan network of switching cells prepended with the shuffle exchange and (ii) those having a switch constructed from the shuffle-exchange network of switching cells prepended with the shuffle exchange.

In accordance with a broad system aspect of the present invention, a class of N×N decompressors each serving a connection request to route m incoming signals, $m \leq N$, and for enabling the service of any connection request in a nonblocking way on the condition that the connection request is compliant to certain constraints, each of the decompressors includes: (a) a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses and an array of N output ports with N distinct output addresses wherein the m incoming signals arrive at m distinct input ports determining m active input addresses and are destined for corresponding m distinct output ports determining m active output addresses, and wherein said constraints on the connection request are that: (1) the m active input addresses are consecutive upon a rotation of the ordering of the N input addresses, and (2) the correspondence between the

m active input addresses and the m active output addresses is order preserving after the rotation; and (b) control circuitry, coupled to the switch, for routing the incoming signals from the m distinct input ports to the corresponding m distinct output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to said constraints on the connection request, said class excluding (i) those having a switch constructed from the banyan network of switching cells prepended with the shuffle exchange and (ii) those having a switch constructed from the shuffle-exchange network of switching cells prepended with the shuffle exchange.

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